

CLAIMS

1. A light-emitting device comprising:

5 a light-emitting element in which a light-emitting material is sandwiched between
a pair of electrodes; and

a thin film transistor including, from a substrate side, a lamination of:

a gate electrode formed by fusing conductive nanoparticles;

10 a gate insulating layer formed in contact with the gate electrode, at least
containing a layer comprising a silicon nitride or a silicon nitride oxide layer and a
silicon oxide layer; and

a semiconductor layer,

wherein a pixel in which the light-emitting element and the thin film transistor are
connected is provided.

15 2. A light-emitting device comprising:

a light-emitting element in which a light-emitting material is sandwiched between
a pair of electrodes; and

a thin film transistor including, from a substrate side, a lamination of:

a gate electrode formed by fusing conductive nanoparticles;

20 a gate insulating layer formed in contact with the gate electrode, at least
containing a layer comprising a silicon nitride or a silicon nitride oxide layer and a
silicon oxide layer;

a semiconductor layer;

25 wirings connected to a source and a drain and formed by fusing conductive
nanoparticles; and

a silicon nitride layer or silicon nitride oxide layer formed by being in contact
with the wirings,

wherein a pixel in which the light-emitting element and the thin film transistor are
connected is provided.

3. A light-emitting device comprising:

a light-emitting element in which a light-emitting material is sandwiched between a pair of electrodes;

a first thin film transistor including, from a substrate side, a lamination of:

5 a gate electrode formed by fusing conductive nanoparticles;

a gate insulating layer formed in contact with the gate electrode, at least containing a layer comprising a silicon nitride or a silicon nitride oxide layer and a silicon oxide layer; and

a semiconductor layer;

10 a driver circuit including a second thin film transistor formed by having the same layer structure as that of the first thin film transistor; and

a wiring extended from the driver circuit and connecting to the gate electrode of the first thin film transistor,

15 wherein a pixel in which the light-emitting element and the thin film transistor are connected is provided.

4. A light-emitting device comprising:

a light-emitting element in which a light-emitting material is sandwiched between a pair of electrodes;

20 a first thin film transistor including, from a substrate side, a lamination of:

a gate electrode formed by fusing conductive nanoparticles;

a gate insulating layer formed in contact with the gate electrode, at least containing a layer comprising a silicon nitride or a silicon nitride oxide layer and a silicon oxide layer;

25 a semiconductor layer;

wirings connected to a source and a drain and formed by fusing conductive nanoparticles; and

a silicon nitride layer or silicon nitride oxide layer formed to be in contact with the wirings;

30 a driver circuit including a second thin film transistor formed by having the same

layer structure as that of the first thin film transistor; and

a wiring extended from the driver circuit and connecting to the gate electrode of the first thin film transistor,

wherein a pixel in which the light-emitting element and the thin film transistor are
5 connected is provided.

5. The light-emitting device according to any one of claims 1 to 4, wherein the conductive nanoparticles comprise silver.

10 6. The light-emitting device according to claim 2 or 4, wherein the semiconductor layer contains hydrogen and halogen and is a semi-amorphous semiconductor having a crystal structure.

7. The light-emitting device according to claim 2 or 4, wherein the driver circuit
15 is composed only of an n-channel type thin film transistor.

8. The light-emitting device according to any one of claims 1 to 4, wherein the thin film transistor includes the semiconductor layer containing hydrogen and halogen and which is a semiconductor having a crystal structure, wherein the thin film transistor
20 is capable of being operated in electric field effect mobility of from $1 \text{ cm}^2/\text{V}\cdot\text{sec}$ to $15 \text{ cm}^2/\text{V}\cdot\text{sec}$.

9. The television receiver according to any one of claims 1 to 4, wherein the light-emitting device includes a display screen.

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10. A method for manufacturing a light-emitting device comprising the steps of:
forming a gate electrode over a substrate having an insulating surface with a droplet discharge method;
laminating a gate insulating layer, a semiconductor layer, and an insulating layer
30 over the gate electrode;

forming a first mask in a position overlapping with the gate electrode with a droplet discharge method;

forming a channel protective layer by etching the insulating layer by the first mask;

5 forming a semiconductor layer containing one conductivity type impurity;

forming a second mask in a region including the gate electrode with a droplet discharge method;

etching the semiconductor layer containing one conductivity type impurity and the semiconductor layer;

10 forming wirings to be connected to a source and a drain with a droplet discharge method; and

etching the semiconductor layer containing one conductivity type impurity on the channel protective layer by using the wirings to be connected to the source and the drain as masks.

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11. A method for manufacturing a light-emitting device comprising the steps of:

forming a gate electrode and a connection wiring over a substrate having an insulating surface with a droplet discharge method;

20 laminating a gate insulating layer, a semiconductor layer, and an insulating layer over the gate electrode;

forming a first mask in a position overlapping with the gate electrode with a droplet discharge method;

forming a channel protective layer by etching the insulating layer by the first mask;

25 forming a semiconductor layer containing one conductivity type impurity;

forming a second mask in a region including the gate electrode with a droplet discharge method;

etching the semiconductor layer containing one conductivity type impurity and the semiconductor layer;

30 partially exposing the connection wiring by selectively etching the gate insulating

layer;

forming wirings to be connected to a source and a drain and connecting at least one of the wirings to the connection wiring; and

etching the semiconductor layer containing one conductivity type impurity on the
5 channel protective layer by using the wirings to be connected to the source and the drain as masks.

12. The method for manufacturing a light-emitting device according to claim 10
or 11, wherein the step of laminating a gate insulating layer, a semiconductor layer, and
10 an insulating layer over the gate electrode is carried out without exposing to the atmosphere.

13. The method for manufacturing a light-emitting device according to claim 10
or 11, wherein the gate insulating film is sequentially laminated by a first silicon nitride
15 film, a silicon oxide film, and a second silicon nitride film.

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